

Appl. No. : 10/690,833
Filed : October 22, 2003

REMARKS

The foregoing amendments and the following remarks are responsive to the January 10, 2006 Final Office Action and the April 4, 2006 Advisory Action. Claims 1 and 19 have been amended, Claims 2-18 and 20 remain as previously filed, and new Claims 21 and 22 are added. Thus, Claims 1-22 are pending in the present application.

In response to the Office Action mailed January 10, 2006 and the Advisory Action mailed April 4, 2006, Applicants respectfully request the Examiner to reconsider the above-captioned application in view of the foregoing amendments and the following comments.

Claims 1-20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Uraki *et al.* (U.S. Patent No. 5,977,515) ("Uraki") in view of Otsubo *et al.* (U.S. Patent No. 6,507,000) ("Otsubo") and Freiwald *et al.* (U.S. Patent No. 6,693,255) ("Freiwald"). Applicants respectfully traverse the present rejections. While Applicants respectfully disagree with the rejections, Applicants have nonetheless amended to Claims 1 and 19 to expedite prosecution. Applicants expressly reserve the right to pursue the original version of Claims 1-20 through continuation practice.

Claims 1-20 Include Limitations that are not Disclosed by the Combination of Uraki, Otsubo, and Freiwald

Claim 1

Amended Claim 1 recites (emphasis added):

1. A laser head adapted to irradiate an interaction region of an inhabitable structure with laser light to remove material from the structure, the laser head comprising:

a housing;

a connector coupled to the housing and optically coupled to a laser generator, the connector adapted to transmit laser light from the laser generator;

at least one optical element contained in the housing and optically coupled to the connector, the optical element adapted to receive laser light from the connector; and

a containment plenum coupled to the housing, the containment plenum optically coupled to the optical element to receive the laser light from the optical element, the containment plenum adapted to confine the material and remove the material from the interaction region resulting from irradiating the structure with the laser light, **wherein the containment plenum is cooled by a cooling medium flowing through a cooling conduit of the containment plenum, the cooling conduit fluidly**

coupled to a source of the cooling medium that is spaced from the containment plenum.

Applicants submit that the combination of Uraki in view of Otsubo and Freiwald does not disclose or suggest all the limitations of amended Claim 1. For example, the combination of Uraki, Otsubo, and Freiwald does not disclose or suggest “a containment plenum coupled to the housing, the containment plenum optically coupled to the optical element to receive the laser light from the optical element, the containment plenum adapted to confine the material and remove the material from the interaction region resulting from irradiating the structure with the laser light, wherein the containment plenum is cooled by a cooling medium flowing through a cooling conduit of the containment plenum, the cooling conduit fluidly coupled to a source of the cooling medium that is spaced from the containment plenum.” Therefore, Claim 1 is patentably distinguished over the combination of Uraki, Otsubo, and Freiwald. Accordingly, Applicants respectfully request the Examiner withdraw the rejection of Claim 1 and pass this claim to allowance.

Claims 2-18 and 20

Claims 2, 12, 14, 15, 17, 18, and 20 depend from Claim 1. Claims 3-5 depend from Claim 2. Claims 6 and 7 depend from Claim 5. Claims 8-11 depend from Claim 7. Claim 13 depends from Claim 12. Claim 16 depends from Claim 15. Applicants also submit that Claims 2-18 and 20 also define over the cited references, not only because they depend from Claim 1, but also on their own merit. Therefore, Applicants respectfully request the Examiner withdraw the rejection of Claims 2-18 and 20 and pass these claims to allowance.

Claim 19

Amended Claim 19 recites (emphasis added):

19. A laser head adapted to irradiate an interaction region of an inhabitable structure with laser light to remove material from the structure, the laser head comprising:

- means for connecting the laser head to a laser generator;
- means for receiving the laser light from the laser generator;
- means for guiding the laser light to the interaction region; and
- means for confining the material and removing the material from the interaction region, **the confining means being cooled by a cooling medium flowing through a cooling conduit of the confining means, the**

cooling conduit fluidly coupled to a source of the cooling medium that is spaced from the confining means.

Applicants submit that the combination of Uraki, Otsubo, and Freiwald does not disclose or suggest all the limitations of amended Claim 19. For example, the combination of cited references does not disclose or suggest “means for confining the material and removing the material from the interaction region, the confining means being cooled by a cooling medium flowing through a cooling conduit of the confining means, the cooling conduit fluidly coupled to a source of the cooling medium that is spaced from the confining means.” Accordingly, Claim 19 is patentably distinguished over the combination of Uraki, Otsubo, and Freiwald. Thus, Applicants respectfully request the Examiner withdraw the rejection to Claim 19 and pass this claim to allowance.

The Prior Art does not Provide a Motivation to Combine Uraki, Otsubo, and Freiwald

Uraki teaches a chamber for use in underwater operation of a laser. See, e.g., Uraki Figure 1. The edges of the chamber are pressed against the submerged surface and water is then evacuated from the chamber by application of a water discharging mechanism 16 and a gas-injecting mechanism 15 to fill the interior of the compartment with an inert gas atmosphere. Uraki, col. 8, lines 22-34. Uraki then specifies, “With such a mechanism or mechanisms, the above portion of the chamber is mounted in close contact with the surface of the structure so that permeation of water from the surrounding region is prevented.” Uraki, col. 12, lines 34-37 (emphasis added).

Freiwald teaches a cleaning head with a vacuum system that draws ambient air through an aperture 36 to cool and clear ablated material. See, e.g., Freiwald Figures 3A, 3B, and col. 6 lines. 52-67. The nozzle in Freiwald is necessarily placed near, but is not pressed against, the surface being ablated. For example, Freiwald discloses that “the nozzle rides a few millimeters above the surface being cleaned.” Freiwald, col. 6, lines 55-57. Indeed, Freiwald states, “The cleaning head **must permit some ambient air to enter the nozzle**, in order to cool the ablated material and dilute and entrain the ablated material for easier filtration.” Freiwald, col. 5, lines 40-44 (emphasis added). Similarly, Otsubo teaches having a gap E between the laser drilling machine and the workpiece which is “required for allowing free movements of the workpiece 4.”

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Otsubo, col.2, lines. 57-58. Furthermore, Otsubo teaches that "air may be drawn in from outside through this gap E." Otsubo col. 3, lines. 42-43.

If the system of Uraki were pulled some distance away from the surface being irradiated as taught by Freiwald or of Otsubo, water from the surrounding environment would flood the chamber, preventing operation. Similarly, if the system of Freiwald or of Otsubo were pressed tightly against the surface being cleaned, it would be unable to draw ambient air from the surrounding environment or would be unable to move. Accordingly, it would not have been obvious to modify Uraki using the teachings of Freiwald or Otsubo because the system disclosed by Uraki, as modified by Freiwald or Otsubo, would be rendered unsatisfactory for its intended purpose. If a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. M.P.E.P. § 2143.01(V). Moreover, the ambient air required by Freiwald is unavailable for the system disclosed by Uraki because Uraki teaches use of the chamber underwater. For at least the above-stated reasons, it would not have been obvious to combine Uraki with Freiwald and Otsubo.

Thus, Claims 1-20 are patentably distinguished over the combination of Uraki, Otsubo, and Freiwald. Therefore, Applicants respectfully request the Examiner withdrawn the rejections and pass these claims to allowance.

SUMMARY

For at least the reasons described above, Applicants respectfully request the Examiner pass Claims 1-22 to allowance.

The undersigned has made a good faith effort to respond to all of the rejections and objections in the case and to place the claims in condition for immediate allowance. Nevertheless, if any undeveloped issues remain or if any issues require clarification, the Examiner is respectfully requested to call Applicants' attorney in order to resolve such issue promptly.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

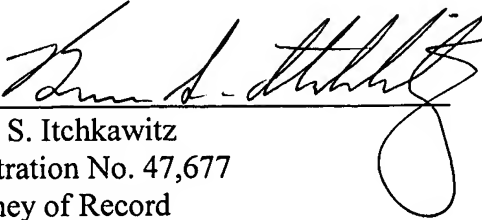
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Respectfully submitted,

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